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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/646,551

08/21/2003

Zhibo Zhao

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9433

7590

07/26/2006

SCOTT A. MCBAIN
DELPHI TECHNOLOGIES, INC.
Mail Code: 480-410-202
P.O. Box 5052
Troy, MI 48007-5052

EXAMINER

NGUYEN, DINH Q

ART UNIT

PAPER NUMBER

3752

DATE MAILED: 07/26/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/646,551

Applicant(s)

ZHAO ET AL.

Examiner

Dinh Q. Nguyen

Art Unit

3752

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on 24 April 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) 17-20 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-16 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☐ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-3, 5-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Van Steenkiste et al (U.S. Patent No. 6,139,913) or Popoola et al (U.S. Patent No. 6,464,933) in view of Roberts et al.

With respect to claims 1, 3, 5 and 7, Van Steenkiste et al. or Popoola et al. teaches all the limitations of the claims except for gas flow holes with hydraulic diameter of 0.5 to 5.0 millimeters and a length from 10-30 millimeters. However, Roberts discloses a collimator having flow holes with hydraulic diameter of 0.5 millimeters and a length such that can be selected (column 2, lines 37+). Therefore, it would have been obvious to one having ordinary skill in the art to have provided the device of Van Steenkiste et al. or Popoola et al. with a hydraulic diameter of 0.5 to 5.0 millimeters and a length from 10-30 millimeters as suggested by Roberts. Doing so would provide a way to control flow (see column 1, lines 22+).

With respect to claims 3, 6 and 9, Van Steenkiste et al. or Popoola et al. in view of Roberts teach all the limitations of the claims except for the ratio of the hydraulic diameter to the length is 1:5 to 1:50, or the ratio of the collimator cross sectional area to the cross sectional area of the mixing chamber is 0.5:1 to 0.9:1. It would have been

obvious to one having ordinary skill in the art at the time of the invention was made to have provided the device of Van Steenkiste et al. or Popoola et al. in view of Roberts with the ratio of the hydraulic diameter to the length is 1:5 to 1:50, or the ratio of the collimator cross sectional area to the cross sectional area of the mixing chamber is 0.5:1 to 0.9:1, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable range involves only routine skill in the art. *In re Aller*, 220 F.2d 454, 105 USPQ 233, 235 (CCPA 1955).

3. Claims 1-3, 5-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Van Steenkiste et al (U.S. Patent No. 6,139,913) or Popoola et al (U.S. Patent No. 6,464,933).

With respect to claims 1-3, 5-7, Van Steenkiste et al or Popoola et al. teaches all the limitations of the claims except for gas flow holes of 10-25 millimeters length, the ratio of the hydraulic diameter to the length is 1:5 to 1:50, or the ratio of the collimator cross sectional area to the cross sectional area of the mixing chamber is 0.5:1 to 0.9:1. At the time the invention was made, it would have been an obvious matter of design choice to a person of ordinary skill in the art to configure the device of Van Steenkiste et al or Popoola et al with gas flow holes of 10-25 millimeters length, or the ratio of the hydraulic diameter to the length is 1:5 to 1:50, or the ratio of the collimator cross sectional area to the cross sectional area of the mixing chamber is 0.5:1 to 0.9:1, because Applicant has not disclosed that to have the gas flow holes of 10-25 millimeters length, or the ratio of the hydraulic diameter to the length is 1:5 to 1:50, or the ratio of the collimator cross sectional area to the cross sectional area of the mixing chamber is

0.5:1 to 0.9:1 provides an advantage, is used for a particular purpose, or solves a stated problem. One of ordinary skill in the art, furthermore, would have expected Applicant's invention to perform equally well with either Van Steenkiste et al or Popoola et al configurations or the claimed configuration, because they both perform the same function of kinetic spraying. Therefore, it would have been an obvious matter of design choice to modify the Van Steenkiste et al or Popoola et al device to obtain the invention as specified in claims 1-3, 5-7.

Furthermore, with respect to claims 1-3, 5-7, Van Steenkiste et al. or Popoola et al. teaches all the limitations of the claims except for gas flow holes of 10-25 millimeters length, the ratio of the hydraulic diameter to the length is 1:5 to 1:50, or the ratio of the collimator cross sectional area to the cross sectional area of the mixing chamber is 0.5:1 to 0.9:1. It would have been obvious to one having ordinary skill in the art at the time of the invention was made to have provided the device of Van Steenkiste et al. or Popoola et al. with gas flow holes of 10-25 millimeters length, the ratio of the hydraulic diameter to the length is 1:5 to 1:50, or the ratio of the collimator cross sectional area to the cross sectional area of the mixing chamber is 0.5:1 to 0.9:1, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable range involves only routine skill in the art. *In re Aller*, 220 F.2d 454, 105 USPQ 233, 235 (CCPA 1955).

4. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Van Steenkiste et al. or Popoola et al. or in view of Roberts et al. as applied to claims 1-3, 5-10 above, and further in view of Mochida.

Van Steenkiste et al. or Popoola et al. or in view of Roberts et al. teaches all the limitations of the claims except for hexagonal shape gas flow holes. However, Mochida discloses gas flow holes of hexagonal shape (figure 3B). Therefore, it would have been obvious to one having ordinary skill in the art to have provided the device of Van Steenkiste et al. or Popoola et al. or in view of Roberts et al. with hexagonal shape gas flow holes as suggested by Mochida. Doing so would provide an effective gas flow device.

5. Claim 11-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Van Steenkiste et al. or Popoola et al. or in view of Roberts et al. as applied to claims 1-3, 5-10 above, and further in view of Belashchenko et al.

Van Steenkiste et al. or Popoola et al. or in view of Roberts et al. teaches all the limitations of the claims except for an injector tube extending through the throat. However, Belashchenko et al discloses a spraying system with an injector tube 68 that extending to the throat. Therefore, it would have been obvious to one having ordinary skill in the art to have provided the device of Van Steenkiste et al. or Popoola et al. or in view of Roberts et al. with the injector tube extending through the throat as suggested by Belashchenko. Doing so would provide a way to introduce material into a high velocity flow stream of gas (see column 11, lines 34-55).

With respect to claims 12-16, at the time the invention was made, it would have been an obvious matter of design choice to a person of ordinary skill in the art to provide different configurations or location of the injector tube, or with different flow rate for the injector tube.

Response to Arguments

6. Applicant's arguments filed 4/24/06 have been fully considered but they are not persuasive. The Examiner maintaining the rejections of 1/23/06. The gas collimator of Van Steenkiste et al. or Popoola et al. does not have the claimed dimensions, but in view of Roberts et al. teaching reads on the claimed subject matters of the claims. Furthermore, discovering the optimum or workable range involves only routine skill in the art. *In re Aller*, 220 F.2d 454, 105 USPQ 233, 235 (CCPA 1955).


7. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dinh Q. Nguyen whose telephone number is 571-272-4907. The examiner can normally be reached on Monday-Thursday 6:00-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Scherbel can be reached on 571-272-4919. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Dinh Q. Nguyen
Primary Examiner
Art Unit 3752

dqn